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MODEL 7510 DSU

USER'S GUIDE

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About This Guide

Document Purpose and Intended Audience

This guide contains information needed to set up, configure, and operate the Model 7510 DSU and is intended for installers and operators.

Document Summary

Section	Description
Chapter 1	<i>About the DSU.</i> Describes the DSU features and shows examples of typical configurations.
Chapter 2	<i>Using the Asynchronous Terminal Interface.</i> Provides instructions for accessing the user interface and navigating the screens.
Chapter 3	<i>Customizing the DSU.</i> Provides procedures for setting up the user interface and DSU configuration.
Chapter 4	<i>Monitoring the DSU.</i> Describes monitoring details about the LEDs, DSU status, and network statistics.
Chapter 5	<i>Testing.</i> Provides details about available tests and test setup.
Chapter 6	<i>Messages and Troubleshooting.</i> Provides information on device messages and troubleshooting.
Appendix A	<i>Configuration Option Tables.</i> Contains all configuration options, default settings, and possible settings.
Appendix B	<i>Worksheets.</i> Contains all the configuration options, default settings, and possible settings to use for planning.
Appendix C	<i>Cables and Pin Assignments.</i> Contains connector and interface details.
Appendix D	<i>Technical Specifications.</i> Contains physical and regulatory specifications of the DSU.

Section	Description
Glossary	Defines acronyms and terms used in this document.
Index	Lists key terms, acronyms, concepts, and sections in alphabetical order.

Product-Related Documents

Document Number	Document Title
7510-A2-GN10	<i>Model 7510 DSU Startup Instructions</i>

To order additional product documentation, refer to [Warranty, Sales, and Service Information](#) on page A at the beginning of this User's Guide.

About the DSU

1

Model 7510 DSU Features

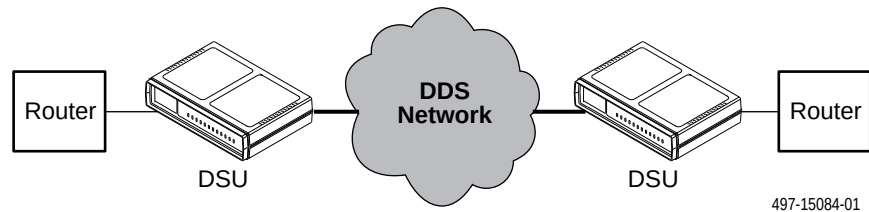
The DSU provides an interface between the customer premises equipment (CPE) and a Digital Data Service (DDS) network.

The DSU's features and capabilities include:

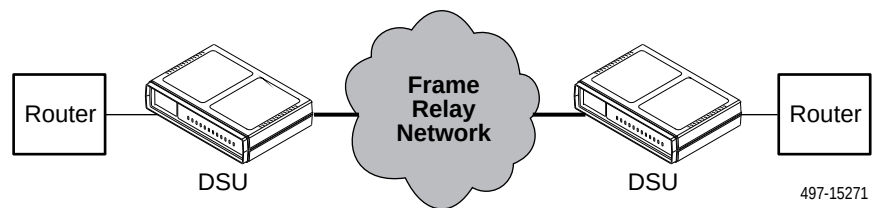
- **Easy Installation.** Connects to your equipment using standard connectors and cables.
- **Easy Configuration.** A compact and well-thought set of configuration options minimizes your customization effort.
- **DDS Operation.** Operates at 56 and 64 kbps CC (clear channel).
- **Local Area Data Set (LADS) Operation.** Operates at 56 and 64 kbps full-duplex as a limited-distance modem.
- **Autorating.** Automatically adjusts to the detected line rate.
- **Data Port Rates.** Automatically adjusts to the DDS or LADS operating rates.
- **Asynchronous Terminal Interface (ATI).** Provides a menu-driven VT100-compatible interface for configuring and managing the DSU.
 - **Local Management.** Provides local management using an asynchronous terminal connection through the Terminal port.
 - **Remote Management.** Provides remote management using an external modem through the Terminal port.
- **Diagnostics.** Lets you diagnose device and network problems with digital loopbacks and pattern tests.
- **Device and Test Monitoring.** Lets you track and evaluate the unit's operation with status and test result information.

Typical DSU Configurations

The following illustration shows a typical LAN/WAN interconnection application for the DSU. The routers connected to the DSU at each location provide the LAN interconnection.



The DSU can also be used in a Frame Relay network.



Two DSUs can be connected back-to-back to act as Local Area Data Sets.

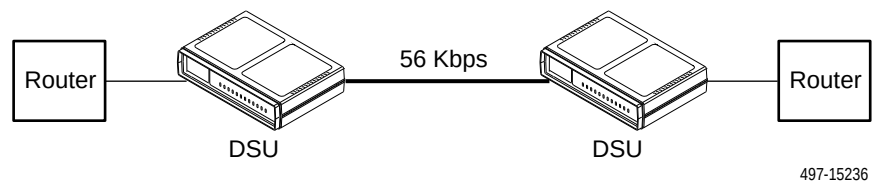
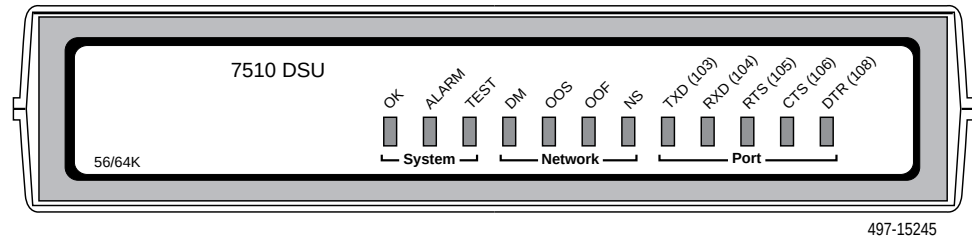


Table D-2 in Appendix D shows the maximum distances for LADS applications.

User Interfaces

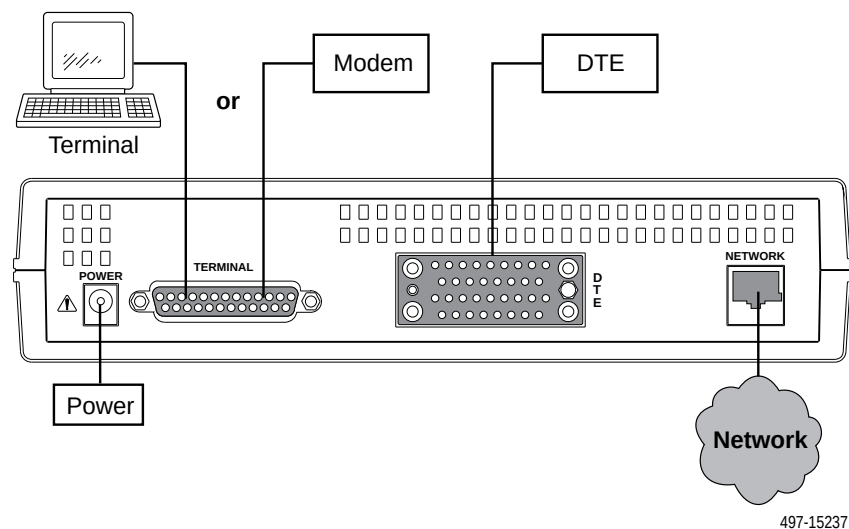
There are two types of user interfaces for the DSU:

- Menu-driven Asynchronous Terminal Interface (ATI) screens (see *Using the Asynchronous Terminal Interface*, Chapter 2).
- Front panel LED status indicators (see *Monitoring the DSU*, Chapter 4).



Rear Panel Interfaces

The following illustration shows the physical interfaces of the DSU. Information about the installation of the DSU is contained in the *Model 7510 DSU Startup Instructions*.



Using the Asynchronous Terminal Interface

2

Connecting to the Terminal Port

The device used for the Asynchronous Terminal Interface (ATI) can be a VT100-compatible async terminal, or a PC running emulation software. The terminal or PC can be connected to the Terminal port directly, or through an external modem.

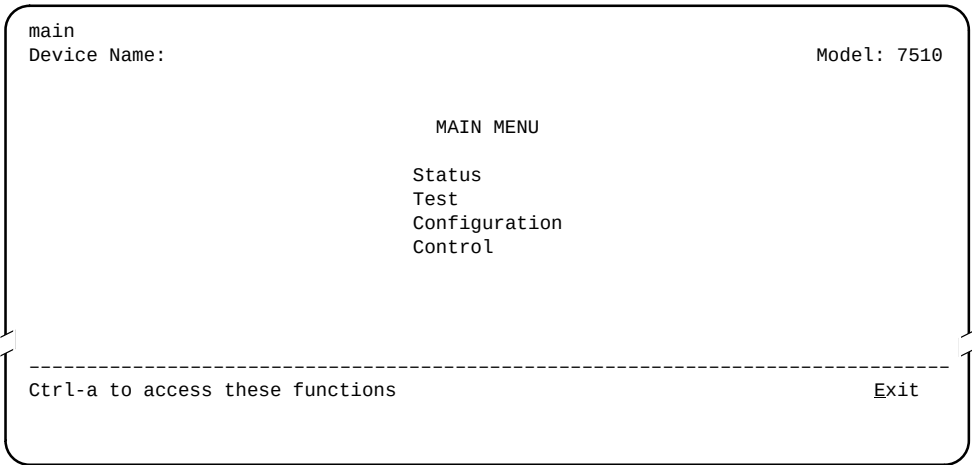
Ensure that the device you connect communicates using these settings:

- Data rate set to 9.6 kbps.
- Character length set to 8.
- Parity set to None.
- Stop Bits set to 1.

Terminal port settings cannot be changed from the ATI.

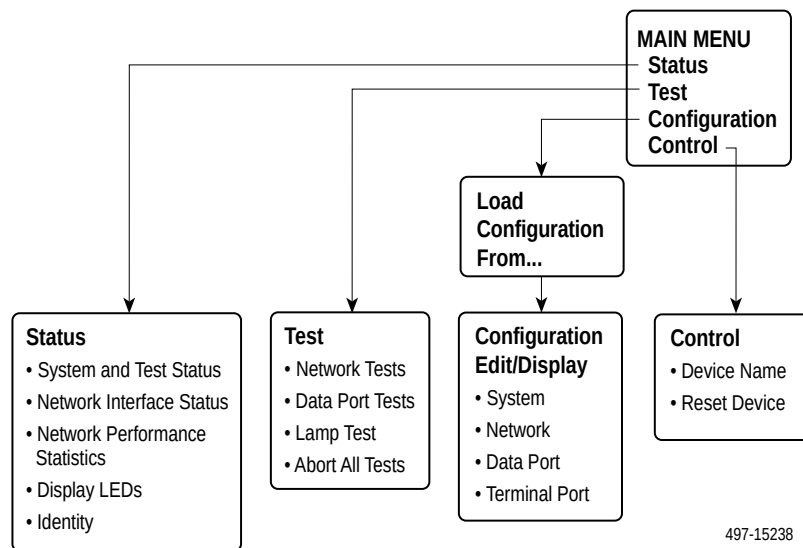
Initiating an ATI Session

The user interface is blank until activated. Press Return to activate the user interface. The first time you do this the Main Menu screen is displayed.



Entry to all of the DSU's tasks begins at the Main Menu screen, which has four menus or branches.

Select ...	To ...
Status	View results of diagnostic tests, network status of interfaces, statistics, LEDs, and DSU identity information.
Test	Select and cancel tests for the DSU's interfaces.
Configuration	Display and edit the configuration options.
Control	Establish identification for the DSU and system, or to initiate a power-up reset of the DSU.



Screen Format Types

Three types of screen formats are available on the ATI.

Use the screen format . . .	To . . .
Menu selection	Display a list of available functions for user selection.
Input	Add or change information on a screen. Input or edit fields that have an <u>Underline</u> in the field value or selection. See <i>Screen Work Areas</i> .
Display	Display configuration information and results from performance and DSU-specific tests. Display-only fields that have no underline in the field value.

What Affects Screen Displays

What appears on the screens depends on the:

- **Current configuration** – How the DSU is currently configured.
- **Data selection criteria** – What you entered in previous screens.

Screen Work Areas

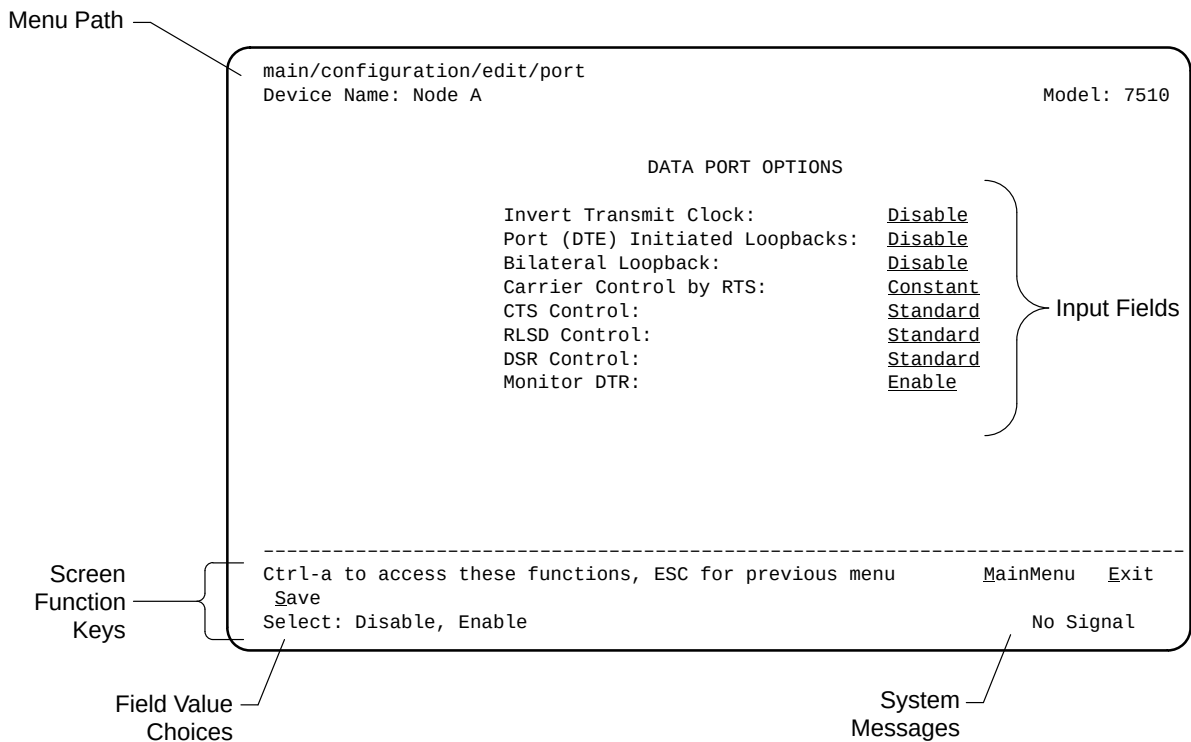
There are two user work areas:

- **Screen area** – This is the area above the dotted line that provides the menu path, menus, and input fields.

The menu path appears as the first line on the screen. In this manual, the menu path is presented as a menu selection sequence with the names of the screens:

*Main Menu → Configuration (Load Configuration From) →
Configuration Edit/Display → Data Port Options*

- **Screen function key area** – This is the area below the dotted line that lists function keys specific to the screen, field value choices, and system messages.



Navigating the Screens

You can navigate the screens by:

- Using keyboard keys
- Using screen function keys
- Switching between the two screen work areas

Keyboard Keys

Use the following keyboard keys to navigate within the screen.

To . . .	Press . . .
Move cursor between the screen area and the screen function keys area below the dotted line at the bottom of the screen	Ctrl-a
Return to the previous screen	Esc
Move cursor to the next field on the screen	Tab
Accept entry or display valid options on the last row of the screen when pressed before entering data or after entering invalid data	Return (Enter)
Move cursor to the previous field	Ctrl-k
Select the next valid value for the field	Spacebar
Delete character that the cursor is on	Delete (Del)
Move cursor up one field within a column on the same screen	Up Arrow or Ctrl-u
Move cursor down one field within a column on the same screen	Down Arrow or Ctrl-d
Move cursor one character to the right in a text field	Right Arrow or Ctrl-f
Move cursor one character to the left in a text field	Left Arrow or Ctrl-b
Redraw the screen display, clearing information typed in but not yet entered	Ctrl-l

► Procedure

To make a menu or field selection:

1. Press the tab key or the right arrow key to position the cursor on a menu or field selection. Each selection is highlighted as you press the key to move the cursor from position to position.
2. Press Return. The selected menu or screen appears.
3. Continue Steps 1 and 2 until you reach the screen you want.

The current setting or value appears to the right of the field name. The valid choices for the field are displayed in the screen function area. You can enter information into a selected field by typing in the first letter or letters of a field value or command.

If a field is blank and the Field Values screen area displays valid selections, press the spacebar and the first valid value for the field will appear. Continue pressing the spacebar to scroll through other valid values.

Screen Function Keys

All screen function keys located below the dotted line operate the same way (upper- or lowercase) throughout the screens.

For the screen function . . .	Select . . .	And press Return to . . .
<u>M</u> ainMenu	M or m	Return to the Main Menu screen.
<u>E</u> xit	E or e	Terminate the async terminal session.
<u>S</u> ave	S or s	Save information.
<u>R</u> efresh	R or r	Update screen with current information.
<u>C</u> lrStats	C or c	Clear network performance statistics and refresh the screen.
Pg <u>U</u> p	U or u	Display the previous page.
Pg <u>D</u> n	D or d	Display the next page.
<u>R</u> esetMon	R or r	Reset an active Monitor 511 test counter to zero.

Switching to the Screen Function Key Area

Selecting Ctrl-a allows you to switch between the two screen work areas to perform all screen functions.

► Procedure

To access the screen function area below the dotted line:

1. Press Ctrl-a to switch from the screen area to the screen function key area below the dotted line. The available selections for the first input field appear on the last line as shown below.
2. Select either the function's designated (underlined) character or press the tab key until you reach the desired function key.

Example:

To reset the Monitor 511 error counter to zero, type r or R (ResetMon).

3. Press Return. The function is performed.
4. To return to the screen area above the dotted line, press Ctrl-a again.

```
main/test/network
Device Name:                                     Model: 7510

                                NETWORK TESTS

Test      Command  Status      Result
-----
CSU Loopback:  Start   Inactive     0:00:00
DSU Loopback:  Start   Inactive     0:00:00

Send V.54 Up:   Send    Sending
Send V.54 Down: Send    Inactive

Send 511:       Start   Inactive     0:00:00
Monitor 511:    Stop    Active       125:08:48   Errors 99999+

-----
Ctrl-a to access these functions, ESC for previous menu   MainMenu  Exit
ResetMon
```

Ending an ATI Session

Use the Exit function key from any screen to terminate the session.

► Procedure

To end an ATI session:

1. Press Ctrl-a to go to the screen function key area below the dotted line.
2. Save changes if required. A confirmation message appears if you have made but not saved changes to your configuration.
3. Tab to Exit (or type e or E) and press Return. The User Interface Idle screen appears.

Customizing the DSU

3

Identifying the Device and System

Use the Device Name screen to determine the name that will be displayed at the top of all ATI screens, and system information that will be displayed on the Identity screen. To access the Device Name screen, follow this menu selection sequence:

Main Menu → Control → Device Name

```
main/control/device name
Device Name: Node A                                     Model: 7510

                                DEVICE NAME

Device Name:      Node A
System Name:      _____
System Location:  _____
System Contact:   _____

                                Clear
                                Clear
                                Clear
                                Clear

-----
Ctrl-a to access these functions, ESC for previous menu   MainMenu  Exit
Save
```

Fields on the Device Name screen are null until you enter values. Allowable values are any printable ASCII character. ASCII printable characters include:

- Numeric 0–9
- Upper or lower case A–Z
- Space
- All ASCII symbols

Use the left and right arrow keys to scroll through the fields. Select Clear to reset a field to a null value.

► Procedure

To enter Device Name screen information:

1. Position the cursor in the Device Name field. Enter a name unique in your system to identify the unit.
The maximum length of Device Name is 20 characters.
2. Position the cursor in the System Name field. Enter a name unique in your network to identify the system.
The maximum length of System Name is 127 characters.
3. Position the cursor in the System Location field. Enter the physical location of the system.
The maximum length of System Location is 127 characters.
4. Position the cursor in the System Contact field. Enter the name and contact information for the person responsible for the unit.
The maximum length of System Contact is 127 characters.
5. Save the Device Name screen information as shown in the next section.

Saving Configuration Options

When changes are made to the configuration options, the changes must be saved to take effect. Use the Save key or Save Configuration screen.

► Procedure

To save configuration options changes:

1. Press Ctrl-a to switch to the screen function key area below the dotted line.
2. Select Save and press Return.

NOTE:

When Exit is selected before Save, a Save Configuration screen appears requiring a Yes or No response.

If you select ...	Then ...
Yes	The configuration is saved.
No	The Main Menu appears and changes are not saved.

Configuring the DSU

Configuration option settings determine how the DSU operates. Use the DSU's Configuration branch to display or change configuration option settings.

Configuration Option Areas

The DSU is shipped with factory settings in the Default Factory configuration area. You can find default information by:

- Referring to *Configuration Option Tables*, Appendix A, or *Worksheets*, Appendix B.
- Accessing the Configuration branch of the DSU menu.

The DSU has two sets of configuration option settings. The Current Configuration matches the Default Factory Configuration until modified and saved by the user.

Configuration Option Area	Configuration Option Set
Current Configuration	The DSU's active set of configuration options.
Default Factory Configuration	A read-only configuration area containing the factory default configuration options.

If the factory default settings do not support your network's configuration, customize the configuration options for your application.

Accessing and Displaying Configuration Options

To display the configuration options, you must first copy one configuration option set into the edit area.

► Procedure

To load a configuration option set into the configuration edit area:

1. Follow this menu selection sequence:
Main Menu → Configuration (Load Configuration From)
2. Select Current Configuration or Default Factory Configuration. Press Return. The selected configuration option set is loaded and the Configuration Edit/Display menu screen appears.

See *Appendix A* for a list and explanation of the configuration options available.

Monitoring the DSU

4

What to Monitor

This chapter presents information on how to access and monitor DSU status and performance statistics on the DDS network. You can monitor DSU operations by viewing:

- System and Test Status screen
- Highest priority Health and Status message on the last line of all screens
- Network Interface Status screen
- Network Performance Statistics screen
- LEDs on the ATI Status screen or the DSU's front panel

Table 4-1 shows the available indicators of alarm conditions on the network interface and the User Data port.

Table 4-1. Alarm Indicator Locations

Alarm Condition	Status Screen	Specific LED
Crossed Pairs	Y	N
No Signal (NS)	Y	Y
Out of Service (OOS)	Y	Y
Out of Frame (OOF)	Y	Y
Excessive Bipolar Violations (BPV)	Y	N
Inband Framing Error	Y	N

Viewing System and Test Status

To view System and Test Status information, follow this menu selection sequence:

Main Menu → Status → System and Test Status

The System and Test Status screen has three sections:

- **Health and Status** – Displays messages in priority order (highest to lowest). Refer to [Health and Status Messages](#), Table 4-2.
- **Self-Test Results** – Results of the Diagnostic test run on the device itself. Refer to [Self-Test Results Messages](#), Table 4-3.
- **Test Status** – Currently active tests. Refer to [Test Status Messages](#), Table 4-4.

```

main/status/system
Device Name: Node A                                     Model: 7510

                                SYSTEM AND TEST STATUS

HEALTH AND STATUS          SELF-TEST RESULTS      TEST STATUS

Cross Pair Detection        Device Fail          No Test Active
No Signal hhh:mm:ss        Memory Fail        CSU Loopback Active
Out of Service hhh:mm:ss   Passed            Network-init. CSU LB Active
Out of Frame hhh:mm:ss    DSU Loopback Active
Excessive BPVs hhh:mm:ss   Network-init. DSU LB Active
User Data Port DTR Off     V.54-initiated DSU LB Active
Device Fail yyyyyyy        Local Loopback Active
DSU Operational            Sending 511 on Port
                           Monitoring 511 on Port
                           Sending 511 on Network
                           Monitoring 511 on Network
                           Lamp Test Active

-----
Refresh   Clear                               ESC for previous menu   MainMenu   Exit

```

Health and Status

The following messages appear in the first column of the System and Test Status screen. The highest priority Health and Status message also appears on all ATI screens on the bottom right.

Table 4-2. Health and Status Messages (1 of 2)

Message	What Message Indicates	What To Do
Cross Pair Detection	The DDS Receive (RX) and Transmit (TX) pairs are crossed on the network interface. Alarm LED is on.	Reverse the RX and TX pair at the punchdown block or other termination point.
No Signal <i>hhh:mm:ss</i> ¹	No signal is being received. Local DSU network problem. The Alarm and NS LEDs are on and Network Performance Statistics are active.	1. Verify that the network cable is securely attached at both ends. 2. Contact network provider.
Out of Service <i>hhh:mm:ss</i> ¹	DSU is receiving out of service code from the network for the remote unit. The Alarm and OOS LEDs are on and Network Performance Statistics are active.	1. Verify that the remote site is in service. 2. Contact network provider.
Out of Frame <i>hhh:mm:ss</i> ¹	DSU is detecting an out of frame condition, associated with: ■ Receiving out of frame code from the network. ■ DSU detecting out of frame errors with 64 kbps CC data rate. ■ DSU unable to synchronize local receiver circuit with line signal.	1. Verify that the line rate matches the configured rate. 2. Contact network provider.
Excessive BPVs <i>hhh:mm:ss</i> ¹	Data rates do not match or network trouble is causing bipolar violations. Alarm LED is on and Network Performance Statistics are active.	1. Verify that the network cable is securely attached at both ends. 2. Contact network provider if problem persists.
User Data Port DTR Off	The DTE is not ready to transmit or receive data. This message will not appear unless Monitor DTR is enabled.	Check on the DTE status. Verify that the DTE is powered up and asserting DTR.
¹ <i>hhh:mm:ss</i> indicates the amount of time the condition has existed in hours, minutes, and seconds. When the maximum time has been exceeded, 255:59:59+ appears.		

Table 4-2. Health and Status Messages (2 of 2)

Message	What Message Indicates	What To Do
Device Fail yyyyyyyy	An internal error has been detected by the operating software. yyyyyyyy indicates the 8-digit hexadecimal failure code.	1. Provide the 8-digit failure code shown (yyyyyyyy) to your service representative. 2. Reset the DSU to clear the condition and message.
DSU Operational	DSU is functioning properly and there are no status messages to display.	No action needed.

Self-Test Results

The results of the last power-up or reset self-test appear in the middle column of the System and Test Status screen.

Table 4-3. Self-Test Results Messages

Message	What Message Indicates	What To Do
Device Fail	One or more of the DSU's integrated circuit chips has failed device-level testing.	1. Reset the DSU and try again. 2. Call your service representative for assistance if the message reappears.
Memory Fail	DSU failed memory verification.	
Passed	The DSU has been plugged in or reset and has passed the diagnostic test. There are no other status messages.	No action needed.

Test Status Messages

The **Test Status Messages** in the following table appear in the rightmost column of the System and Test Status screen.

Table 4-4. Test Status Messages

Test Status Message	Meaning
No Test Active	Status message, indicating no local, remote, or network test in progress.
CSU Loopback Active	A CSU Loopback toward the network is currently active.
Network-init. CSU LB Active	A CSU Loopback initiated by the network is currently active.
DSU Loopback Active	A DSU Loopback toward the network is currently active.
Network-init. DSU LB Active	A DSU Loopback initiated by the network is currently active. ■ If the network service is 56 kbps, the network loopback is non-latching. A non-latching loopback ends when the network activation codes stop. ■ If the network service is 64 kbps CC, the network loopback is latching. This condition can only occur when the Network Interface option Network-initiated DSU Loopback (64K CC) is enabled. Refer to Network Interface Options, Table A-2.
V.54-initiated DSU LB Active	A DSU loopback is active that was initiated by the detection of a V.54 sequence originated by the remote unit. This condition can only occur when V.54 Initiated DSU Loopback is enabled. Refer to Network Interface Options , Table A-2.
Local Loopback Active	A local loopback toward the DTE is currently active.
Sending 511 on Port	A 511 test pattern is being sent over the DTE port.
Monitoring 511 on Port	DSU is monitoring a 511 test pattern over the DTE port.
Sending 511 on Network	A 511 test pattern is being sent over the network interface.
Monitoring 511 on Network	DSU is monitoring a 511 test pattern on the network interface.
Lamp Test Active	The Lamp Test is active, causing the LEDs on the front panel to light.

Viewing Network Interface Status

The network interface status fields are read-only:

- **Line Rate (Kbps).** If the DSU is connected to an operating line and the Line Rate (Kbps) shows Autobaud and does not change to a line rate within about 15 seconds, Line Rate (Kbps) may have to be reconfigured manually. Refer to [Network Interface Options](#), Table A-2.
- **Loop Loss (dB).** The loop loss is the loss of signal strength of the receive line signal from the local loop.

To view the Network Interface Status, follow this menu selection sequence:

Main Menu → Status → Network Interface Status

Table 4-5 describes the contents of the Network Interface Status screen.

Table 4-5. Network Interface Status Screen Contents

Field	Status	What the Status Indicates
Line Rate (Kbps)	56 Kbps 64 CC 64 LADS Autobaud	Line rate on the network interface. Autobaud indicates the DSU is trying to determine the network line rate. This should be a temporary condition.
	No Signal	No signal can be detected over the network interface.
Loop Loss (dB)	0 to –65 dB	Amount of loop loss – loss of signal strength of the receive line signal from the local loop, measured in decibels.
	Inoperative	The line may be disconnected.

Viewing Network Performance Statistics

Performance statistics for the network interface are available to:

- Monitor the current status of the network operations.
- View the DSU's performance statistics, which:
 - Assist you in determining the duration of specific conditions.
 - Provide a historical context for problem detection and analysis.

To view the Network Performance Statistics, follow this menu selection sequence:

Main Menu → Status → Network Performance Statistics

```

main/status/performance
Device Name:                                     Model: 7510

                                NETWORK PERFORMANCE STATISTICS

No Signal Count:           101920      26:33:08
Out of Service Count:      0           0:00:00
Out of Frame Count:        621         8:53:49
Excessive BPV Count:       99830      144:28:11
Invalid BPV Count:         87409

-----
Refresh    ClrStats          ESC for previous menu    MainMenu    Exit
  
```

All counts show the number of occurrences since the last reset of the counters.

- **No Signal Count** is the number of occurrences of a No Signal condition.
- **Out of Service Count** is the number of occurrences of an Out of Service (OOS) condition.
- **Out of Frame Count** is the number of occurrences of an Out of Frame (OOF) condition.
- **Excessive BPV Count** is the number of times at least one invalid bipolar violation was detected every 20 ms for a 2-second period.
- **Invalid BPV Count** is a raw count of the number of invalid bipolar violations.

In the last column, *hh:mm:ss* indicates the amount of time the condition has existed in hours, minutes, and seconds. When the maximum time has been exceeded, 255:59:59+ appears.

The screen appears with the cursor in the function area below the dotted line. To update the performance statistics, select Refresh and press Return.

Select ClrStats and press Return to clear all statistics and refresh the screen.

Monitoring the LEDs

The status of DSU LEDs can be viewed on the Display LEDs Status screen.

The 12 LEDs are organized into three groups:

- **System** LEDs display the status of the unit
- **Network** LEDs display the status of the network interface
- **Port** LEDs display the activity on the user data (DTE) port

To view the LED status screen, follow this menu selection sequence:

Main Menu → Status → Display LEDs

```
main/status/leds
Device Name:
Model: 7510

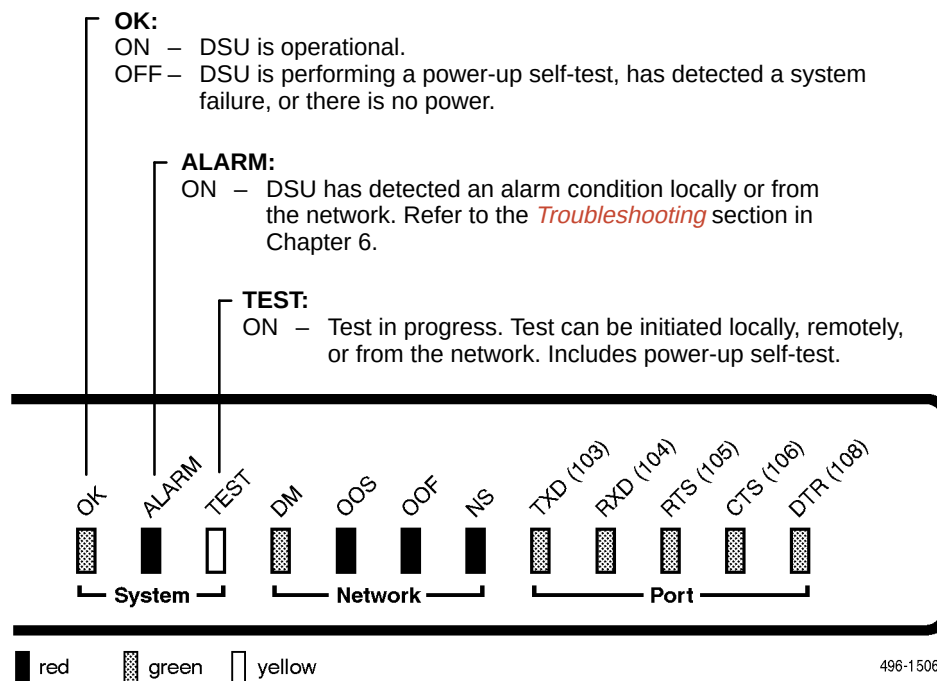
DISPLAY LEDs

SYSTEM          NETWORK          DTE
OK  ALARM  TEST  DM  OOS  OOF  NS  TXD  RXD  RTS  CTS  DTR

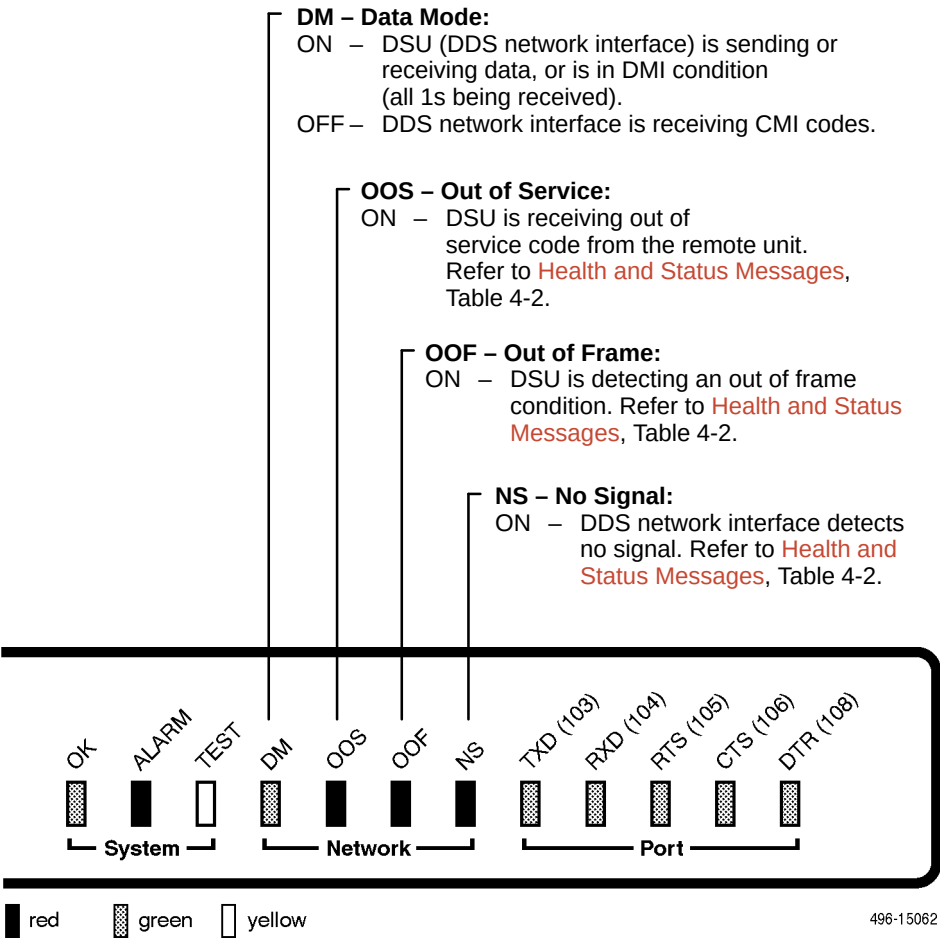
-----
Refresh          ESC for previous menu  MainMenu  Exit
```

When viewed via the ATi, the status display screen is updated approximately every 5 seconds. Use Refresh to obtain a current status of all LEDs.

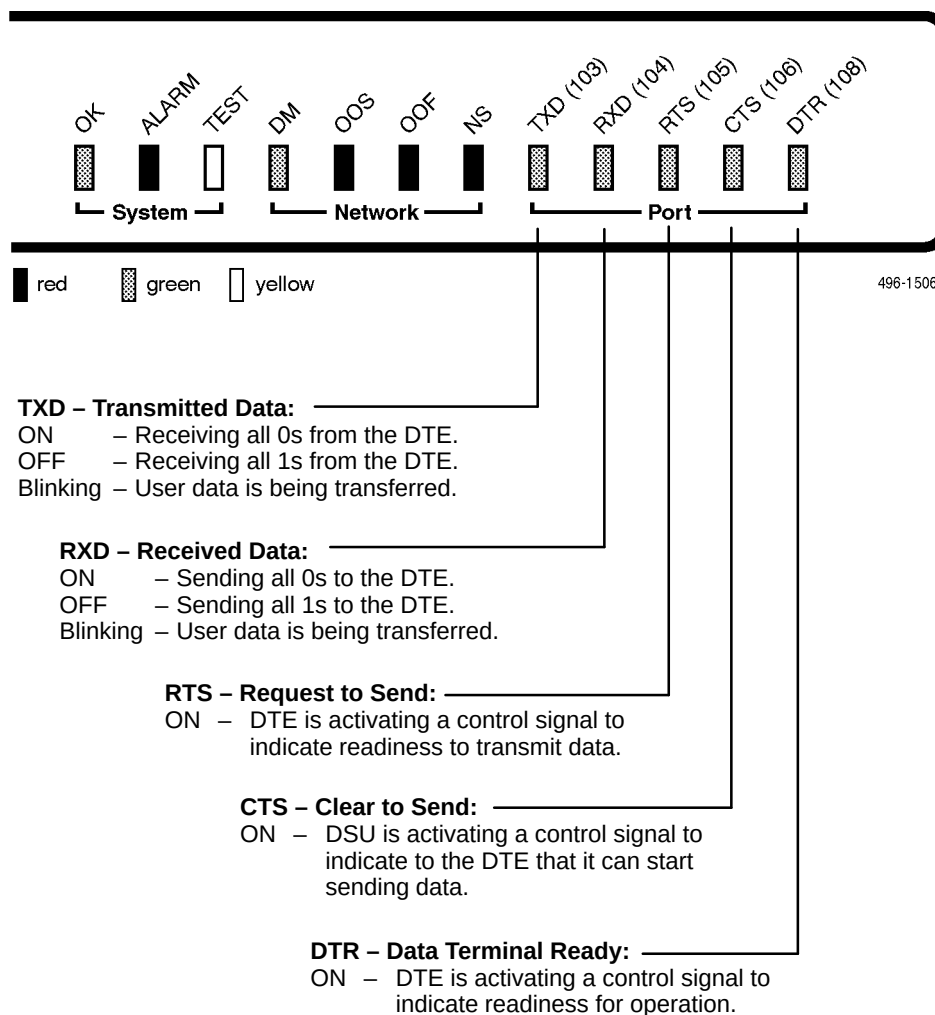
System LEDs



Network LEDs



Port LEDs



Testing

5

Accessing the Test Menu

From the Test menu, you can run network tests, data port tests, and a lamp test for the front panel LEDs.

To access the Test menu, follow this menu selection sequence:

Main Menu → Test

The screenshot shows a terminal window with the following text:

```
main/test
Device Name:                                     Model: 7510

                                TEST

Network Tests
Data Port Tests
Lamp Test

                                Abort All Tests

-----
Ctrl-a to access these functions                                Exit
```

The DSU supports independent tests at the physical level.

- The CSU and DSU loopbacks and 511 test pattern send/monitor are supported on the network interface.
- The Local Loopback and 511 test pattern send/monitor are supported on the DTE port.

Loopbacks can be started from a variety of points in the network, as shown in Table 5-1.

Table 5-1. Device Messages

Loopback Type	Initiated By	Notes
Bilateral Loopback	- User - Remote unit sending V.54 sequence	When enabled, running a DSU loopback also automatically starts a local loopback. Refer to Data Port Options , Table A-3, to enable.
CSU Loopback	- User (Network tests) - DDS Network, by loop current reversal	When initiated by the network, CSU Loopback cannot be disabled by the user.
DSU Loopback (Digital)	User	Refer to Data Port Options , Table A-3.
Local Loopback	- User - DTE via CT141	Control via CT141 can be disabled. Refer to Data Port Options , Table A-3.
Network-initiated 56 kbps DSU Loopback (Non-latching loopback)	DDS Network	Cannot be disabled by user.
Network-initiated 64 kbps CC DSU Loopback (Latching loopback)	DDS Network	Includes optional data scrambling and uses 25-second timer to detect the network sequence. Can be disabled by user.
Remote Digital Loopback	Remote unit sending V.54 sequence	Same as a DSU Loopback but initiated by a remote unit via V.54 sequence. Can be disabled locally. Refer to Network Interface Options , Table A-2.
V.54 Sequences to remote unit	- User - DTE via CT140	Control via CT140 can be disabled. Refer to Data Port Options , Table A-3.

Running Network Tests

Network tests require the participation of your network service provider. To access the Network Tests screen, follow this menu selection sequence:

Main Menu → Test → Network Tests

```
main/test/network
Device Name:                                     Model: 7510

                                NETWORK TESTS

Test      Command  Status      Result
-----
CSU Loopback:  Start  Inactive      0:00:00
DSU Loopback:  Start  Inactive      0:00:00

Send V.54 Up:   Send  Sending
Send V.54 Down: Send  Inactive

Send 511:       Start  Inactive      0:00:00
Monitor 511:    Stop   Active        125:08:48  Errors 99999+

-----
Ctrl-a to access these functions, ESC for previous menu      MainMenu  Exit
ResetMon
```

Use the Command column to start or stop a test by pressing Enter. The Result column displays the test duration since the last device reset. When the Monitor 511 test is active, ResetMon is available to reset the error counter to zero.

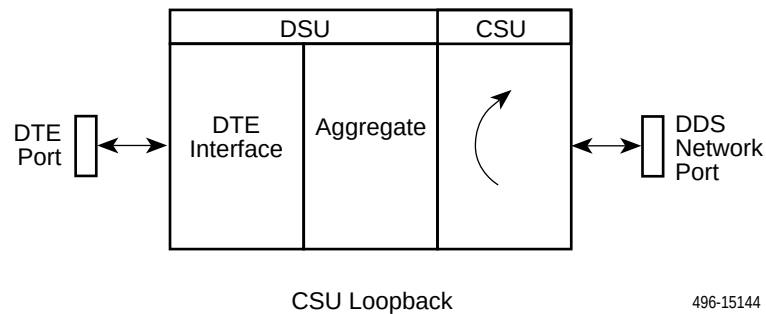
CSU or External Network Loopback

CSU loopback is an external loopback that is located as closely as possible to the network interface.

► Procedure

To run a CSU loopback:

1. Position the cursor at the Start command next to CSU Loopback on the Network Tests screen.
2. Press Enter.
3. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
4. Press Enter. The duration of the test is displayed.



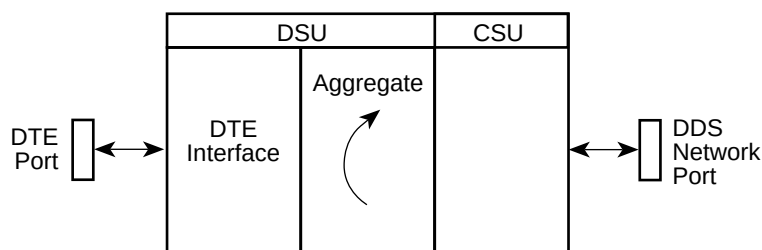
DSU or Internal Network Loopback

DSU loopback is an internal loopback that is located as closely as possible to the customer interface serving the DTE.

► Procedure

To run a DSU loopback:

1. Position the cursor at the Start command next to DSU Loopback on the Network Tests screen.
2. Press Enter.
3. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
4. Press Enter. The duration of the test is displayed.



496-15160

Send V.54 Up/Down Sequences

The local DSU can send an ITU-T V.54 Up or Down sequence to request the activation or termination of a DSU (digital) loopback of a remote unit. This is the same as the DSU Loopback shown above except the test is activated remotely.

The DSU can send:

- In-band V.54 Up (activation) code to request a Remote DSU Loopback (V.54 Loop 2) at the remote DSU or
- In-band V.54 Down (deactivation) code to request the termination of a Remote DSU Loopback (V.54 Loop 2) at the remote DSU

► Procedure

To start or stop a remote DSU loopback:

1. Position the cursor at the Send command next to Send V.54 Up or Send V.54 Down on the Network Tests screen.
2. Press Enter.

Sending appears in the Status column followed (after 3 seconds) by Command Complete at the bottom of the screen.

Refer to *Running Network Tests* for an example of the Network Tests screen.

511 Test Pattern for the Network

This test sends or monitors the 511 test pattern over the network interface.

► Procedure

To run a Send 511 test:

1. Position the cursor at the Start command next to Send 511 on the Network Tests screen.
2. Press Enter.
3. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
4. Press Enter. The duration of the test is displayed.

► Procedure

To run a Monitor 511 test:

1. Position the cursor at the Start command next to Monitor 511 on the Network Tests screen.
2. If desired, use Ctrl-a to switch to the screen function key area and use the virtual function key r or R (ResetMon) to clear the error counter to zero. Press Ctrl-a to return the cursor to the Start command.
3. Press Enter.
4. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
5. Press Enter. The duration of the test is displayed.

Refer to *Running Network Tests* for an example of the Network Tests screen.

Running Data Port Tests

For an example of the fields on a test menu screen, refer to *Running Network Tests*. To access the Data Port Tests screen, follow this menu selection sequence:

Main Menu → Test → Data Port Tests

main/test/port

Device Name: Node A

Model: 7510

DATA PORT TESTS

Test	Command	Status	Result
Local Loopback:	Start	Inactive	000:00:00
Send 511:	Start	Inactive	000:00:00
Monitor 511:	Stop	Active	255:59:59+ - Errors 99999+

Ctrl-a to access these functions, ESC for previous menu

MainMenu

Exit

ResetMon

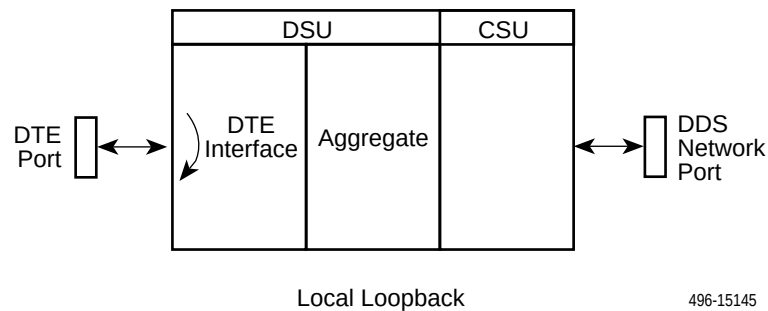
Local Loopback

Local Loopback loops the user data back to the DTE. This loopback is located as closely as possible to the User Data Port (DTE) interface.

► Procedure

To run a local loopback:

1. Position the cursor at the Start command next to Local Loopback on the Data Port Tests screen.
2. Press Enter.
3. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
4. Press Enter. The duration of the test is displayed.



511 Test Pattern for the DTE

This test sends or monitors a 511 test pattern over the User Data Port interface.

► Procedure

To run a Send 511 test:

1. Position the cursor at the Start command next to Send 511 on the Data Port Tests screen.
2. Press Enter.
3. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
4. Press Enter. The duration of the test is displayed.

► Procedure

To run a Monitor 511 test:

1. Position the cursor at the Start command next to Monitor 511 on the Data Port Tests screen.
2. If desired, use Ctrl-a to switch to the screen function key area and use the virtual function key r or R (ResetMon) to clear the error counter to zero. Press Ctrl-a to return the cursor to the Start command.
3. Press Enter.
4. The Start command is changed to Stop. If you want to manually stop the test, verify that the cursor is positioned at the Stop command.
5. Press Enter. The duration of the test is displayed.

The 511 monitor expects the external equipment to provide the clock for the 511 pattern on the interchange circuit CT113 (TT), for timing the incoming pattern. Refer to *V.35 User Data Port Connector* in Appendix C.

Running the Lamp Test

The DSU supports a Lamp test from the Test menu to determine whether all LEDs light up.

During the Lamp test, all LEDs blink simultaneously once per second. When you stop the Lamp test, the LEDs are restored to their normal condition.

To access the Data Port Tests screen, follow this menu selection sequence:

Main Menu → Test → Lamp Test

► Procedure

To run a Lamp test:

1. Position the cursor at the Start command next to Lamp Test on the Lamp Test screen.
2. Press Enter.
3. The Start command is changed to Stop. When you want to stop the test, verify that the cursor is positioned at the Stop command.
4. Press Enter.

Ending an Active Test

A test initiated by the user can be ended by the user.

- A Test Timeout option is available to automatically terminate a user-initiated Loopback or Pattern test after it has been running a specified period of time. Refer to [System Options](#), Table A-1.

Test Timeout does not pertain to tests commanded by the:

- Network, such as the network-initiated CSU and DSU Loopbacks.
- DTE, such as the DTE-initiated Local Loopback.

- On each test screen is a command column. Pressing Return when the cursor is on the Stop command stops the test.
- Use the Abort All Tests selection from the Test menu to stop all tests running on all interfaces, with the exception of network or DTE-initiated loopbacks. Command Complete appears when all tests on all interfaces have been terminated.

Messages and Troubleshooting

6

Messages and Troubleshooting

There are many messages available to assess the status of the device and contribute to problem resolutions. Refer to the following sections:

- *Responding to Device Messages*
- *Troubleshooting*

Responding to Device Messages

The **Device Messages** in Table 6-1, listed in alphabetical order, may appear in the messages area at the bottom of the ATI screens.

Table 6-1. Device Messages (1 of 2)

Device Message	What Message Indicates	What To Do
Command Complete	Action requested has successfully completed.	No action needed.
Invalid Character x	A nonprintable ASCII character has been entered.	Reenter information using valid characters.
Invalid – Network Initiated CSU (or DSU) Loopback Active	Network-initiated loopback was in progress when another selection was made.	No action needed.
Invalid – [Test] Already Active	[Test] can be a CSU, DSU, or DTE Local Loopback, or a Send 511 or Monitor 511. The [test] was already in progress when another selection was made.	■ Allow test to continue. ■ Select another test. ■ Stop the test.

Table 6-1. Device Messages (2 of 2)

Device Message	What Message Indicates	What To Do
Invalid Test Combination	A loopback or 511 pattern test was in progress when Start was selected to start another test, or was active on the same or another interface when Start was selected.	■ Wait until other test ends and message clears. ■ Abort all tests from the Test menu screen. ■ Stop the test from the same screen the test was started from.
Please Wait	Command takes longer than 5 seconds.	Wait until message clears.
Test Active	A test is running and no higher priority health and status messages exist.	■ Contact service provider if test initiated by the network. ■ Wait until the other test ends and message clears. ■ Cancel all tests from the Test screen. ■ Stop the test from the same screen the test was started from.

Troubleshooting

This DSU is designed to provide you with many years of trouble-free service. If a problem occurs, however, refer to Table 6-2 for possible solutions.

Table 6-2. Troubleshooting (1 of 2)

Symptom	Possible Cause	Solutions
Alarm LED is on.	One of several alarm conditions exists. Health and Status displays the alarm condition.	Refer to Health and Status Messages , Table 4-2, for recommended action.
Cannot access the DSU via the ATl.	The terminal is not set up for the correct rate or data format, or the DSU is configured so it prevents access.	1. Check the cable and connections. 2. Set up your terminal or PC emulation as shown in Connecting to the Terminal Port in Chapter 2. 3. Power the DSU on and off and try again.
Device Fail appears on the System and Test Status screen under Self-Test results.	The DSU detects an internal hardware failure.	■ Power the DSU off and on and try again. ■ Contact your service representative.
An LED is not lit.	LED is burned out.	Run the Lamp test. If the LED in question does not flash with the other LEDs, then contact your service representative.
No power, or the LEDs are not lit.	The power cord is not securely plugged into the wall receptacle and into the rear panel connection.	Check that the power cord is securely attached at both ends.
	The wall receptacle has no power.	■ Check the wall receptacle power by plugging in some equipment that is known to be working. ■ Check the circuit breaker. ■ Verify that your site is not on an energy management program.
	Power supply has failed.	Replace power supply.

Table 6-2. Troubleshooting (2 of 2)

Symptom	Possible Cause	Solutions
Not receiving data; DSU is not responding.	■ DDS line rate/speed has changed. ■ Excessive BPVs causing DSU to become stuck in Autobaud mode. ■ Excessive Loop Loss causing DSU to become stuck in Autobaud mode.	1. Verify that your subscriber loop is running at 56 or 64 CC kbps. 2. If getting Excessive BPVs, verify that you do not have a bad cable. If the cable is good, contact the network provider. 3. If getting excessive Loop Loss (dB) indications, install a higher quality cable. Refer to Table D-2 in Appendix D, Model 7510 DSU LADS Connection Distances. 4. If the DDS Line Rate (Kbps) field shows Autobaud, the DSU may be stuck in Autobaud mode. Configure Line Rate (Kbps) for 56 or 64 kbps. 5. Run Loopback tests. Refer to Running Network Tests in of Chapter 5.
Power-Up Self-Test fails. Only Alarm LED is on after power-up.	The DSU has detected an internal hardware failure.	■ Reset the DSU and try again. ■ Contact your service representative.

Resetting the DSU

The DSU can be reset locally or remotely.

To reset the DSU, follow this menu selection sequence:

Main Menu → Control → Reset Device

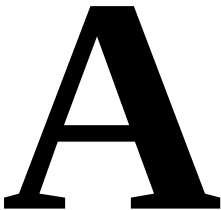
The DSU reinitializes itself, performing a Device Self-Test. Refer to **Self-Test Results Messages**, Table 4-3.

Displaying DSU Identity Information

To display the DSU's system name, location, contact, serial number, model number, and software and hardware revision numbers, follow this menu selection sequence:

Main Menu → Status → Identity

Configuration Option Tables



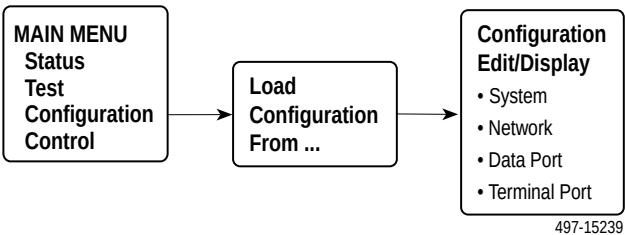
Overview

The tables in this appendix summarize the configuration options accessed when you select Configuration on the Main Menu. The configuration options are arranged into groups based upon functionality.

Select . . .	To Access the . . .	To Configure the . . .
System	System Options, Table A-1	General system options
Network	Network Interface Options, Table A-2	DDS network interface
Data Port	Data Port Options, Table A-3	User data on DTE port
Terminal Port	Terminal Port Options, Table A-4	ATI

NOTE:

All changes to configuration options must be saved. Refer to *Saving Configuration Options* in Chapter 3.



System Options Menu

For System Options, refer to Table A-1. To access the System Options screen, follow this menu selection sequence:

*Main Menu → Configuration (Load Configuration From) →
Configuration Edit/Display → System*

Table A-1. System Options (1 of 2)

Operating Mode
Possible Settings: DDS, LADS Default Setting: DDS
The unit's operating mode depends upon the DSU's application. DDS – Standard DDS network operation. The operating rate is either 56 kbps or 64 kbps CC. LADS – The Local Area Data Set operating mode requires that the local and remote units are connected directly to each other. This is a point-to-point application; also known as LDM.
DDS Line Rate (Kbps)
Possible Settings: 56, 64CC, Autobaud Default Setting: Autobaud
The unit starts up with Autobaud. When the DDS line rate obtained from the service provider is detected, Autobaud is replaced with the actual rate. ■ DDS Line Rate (Kbps) option appears when Operating Mode is set to DDS. NOTE: Setting the actual data rate will result in minimum power-up time. Configuring the actual data rate is recommended after initial installation. 56 – 56 kbps line rate. 64CC – 64 kbps Clear Channel on a 72 kbps circuit. Autobaud – This setting is automatically changed to the actual operating line rate of 56 kbps or 64CC as soon as the signal is detected.
LADS Timing
Possible Settings: Internal, External, Receive Default Setting: Receive
Determines the timing source for the unit. ■ LADS Timing option appears when Operating Mode is set to LADS. Internal – Timing derived from the unit's local clock. Use this setting for the LADS primary timing unit that establishes the timing for both point-to-point units. External – Timing is derived from the external clock provided by the DTE connected to the V.35 interface on circuit CT113 (pins U, W). Receive – Timing is derived from the line receive signal unless the unit is running diagnostic tests. During the tests, the timing source is the internal clock. This setting should be used for a LADS secondary timing unit.

Table A-1. System Options (2 of 2)

LADS Line Rate (Kbps)
Possible Settings: 56, 64 Default Setting: 64
Line operating rate for LADS operation. ■ LADS Line Rate (Kbps) option appears when Operating Mode is set to LADS. 56 – 56 kbps line rate. Provides increased distance for the LADS applications. 64 – 64 kbps line rate.
Test Timeout
Possible Settings: Enable, Disable Default Setting: Enable
Allows user-initiated tests to end automatically. Recommend enabling when the unit is managed remotely through the IMC to avoid the requirement to terminate the test manually. Enable – User-initiated loopback and pattern tests end when test duration is reached. Disable – Tests must be terminated manually from the Network Tests screen. Refer to <i>Running Network Tests</i> in Chapter 5. NOTE: Tests commanded by the DTE or network-initiated tests are not affected by this test timeout.
Test Duration (min)
Possible Settings: 1–120 Default Setting: 10
Number of minutes for a test to be active before automatically ending. ■ Test Duration (min) option appears when Test Timeout is enabled. 1 to 120 – Amount of time in minutes for a user-initiated test to run before terminating.

Network Interface Options Menu

For Network Interface Options, refer to Table A-2. To access the Network Interface Options screen, follow this menu selection sequence:

*Main Menu → Configuration (Load Configuration From) →
Configuration Edit/Display → Network*

Table A-2. Network Interface Options

Network-initiated DSU Loopback (64K CC)
Possible Settings: Enable, Disable Default Setting: Enable
Indicates whether the access unit responds to a DSU latching loopback sequence sent by the network as specified by TR62310. ■ Network-initiated DSU Loopback (64K CC) option appears when Operating Mode is set to DDS in Table A-1. Enable – Responds to network-initiated commands to start and stop a latching DSU loopback. Disable – DSU will not respond to a DSU loopback initiated by the network.
Data Scrambling (64K CC)
Possible Settings: Enable, Disable Default Setting: Disable
Data scrambling is used to suppress the possible simulation of network-initiated DSU latching loopback commands by application data. ■ Data Scrambling (64K CC) option appears when Operating Mode is set to DDS in Table A-1. Enable – Enables data scrambling. The local and remote units must be set the same. Disable – No data scrambling.
V.54 Initiated DSU Loopback
Possible Settings: Enable, Disable Default Setting: Disable
When enabled, user data is looped back to the network when a V.54 Loop Up sequence is received. The DSU loopback ends when a V.54 Loop Down sequence is detected. Enable – DSU loopback can be initiated or terminated by a remote unit sending in-band V.54 Loop 2 Up or Down sequences. Disable – V.54 Loop 2 sequences are ignored.

Data Port Options Menu

For Data Port Options, refer to Table A-3. To access the Data Port Options screen, follow this menu selection sequence:

*Main Menu → Configuration (Load Configuration From) →
Configuration Edit/Display → Data Port*

Table A-3. Data Port Options (1 of 3)

Invert Transmit Clock
Possible Settings: Enable, Disable Default Setting: Disable
The DSU clock provided on Interchange Circuit CT114, Transmit Signal Element Timing DCE source (TXC), is phase inverted with respect to Interchange Circuit CT103, Transmitted Data (TXD). Recommended when data errors are occurring due to long cable lengths. Enable – The DSU-supplied clock is phase inverted with respect to the transmitted data TXD. Disable – The clock supplied by the DSU on TXC is normal (i.e., not inverted).
Port (DTE) Initiated Loopbacks
Possible Settings: Disable, Local, Remote, Both Default Setting: Disable
Specifies whether the DTE can initiate and terminate local and/or remote loopbacks. The DTE loopback control is done through the Interchange Circuits specified by the V.54 standard. NOTE: Refer to <i>Running Network Tests</i> in Chapter 5. Disable – No local or remote loopbacks can be initiated by the DTE. Local – A local loopback can be controlled by the DTE, via the Interchange Circuit LL (CT141), as specified by V.54. The DTE port remains in loopback as long as LL remains on. Aborting the loopback from the ATI has no effect. Remote – A remote digital loopback can be controlled by the DTE, via Interchange Circuit RL (CT140), as specified by V.54. The remote equipment must be able to detect the in-band V.54 loopback sequence. Both – Both the local and remote loopbacks can be controlled by the DTE.
Bilateral Loopback
Possible Settings: Enable, Disable Default Setting: Disable
When a DSU loopback is initiated, a local DTE loopback is also automatically initiated. A Bilateral Loopback can be started by the ATI/NMS or by detection of a V.54 Loop 2 Up sequence. Enable – When Bilateral Loopback is enabled, running a DSU loopback also automatically starts a local loopback. The local loopback ends when the DSU loopback terminates. Disable – Running a DSU loopback does not start a local loopback. NOTE: Refer to <i>Running Network Tests</i> in Chapter 5.

Table A-3. Data Port Options (2 of 3)

Carrier Control by RTS
Possible Settings: Constant, Switched Default Setting: Constant
Simulates Constant or Switched Carrier operation. Constant – The internal RTS is forced on and the DSU is in a constant Data Mode on the transmit line. The external RTS lead is ignored. The actual signal on the line is either all ones (DMI) or DTE transmitted data. Switched – RTS is monitored and CMI codes are transmitted when RTS is off.
CTS Control
Possible Settings: Standard, Follow RTS, Forced On, Circuit Assurance Default Setting: Standard
Specifies the operation of the Interchange Circuit CT106, Clear to Send (CTS), which is an output from the DSU. Standard – CTS follows the internal RTS with a fixed delay, except that CTS will be off when a network interface related alarm is detected or a test is active. The active test may be initiated locally, remotely, or by the network. Follow RTS – CTS follows the external RTS lead without delay, regardless of alarms and tests. Forced On – CTS is always forced on after the unit is powered up with a successful self-test. Circuit Assurance – With circuit assurance, CTS operates the same as the Standard option, except that CTS will also be deasserted when CMI codes are being received.
RLSD Control
Possible Settings: Standard, Forced On Default Setting: Standard
Specifies the operation of the Interchange Circuit CT109, Received Line Signal Detector (RLSD or CD), which is an output from the DSU. Standard – RLSD is asserted when Data Mode is on the receive line. RLSD deasserts when a DDS facility alarm is detected or the DSU is receiving CMI codes. Forced On – RLSD is forced on after the unit is powered up with a successful self-test.
DSR Control
Possible Settings: Standard, Forced On, On During Test Default Setting: Standard
Specifies the operation of the Interchange Circuit CT107, Data Set Ready (DSR), which is an output from the DSU. Standard – DSR is always asserted, except when a DDS facility alarm is reported or the DSU is in Test mode. Forced On – DSR is forced on after the unit is powered up with a successful self-test. On During Test – DSU operates the same as the Standard option, except that DSR remains asserted when the DSU is in Test mode to allow the DTE to send test patterns.

Table A-3. Data Port Options (3 of 3)

Monitor DTR
Possible Settings: Enable, Disable Default Setting: Enable
Indicates to the DSU whether to monitor the Interchange Circuit CT108, Data Terminal Ready (DTR), from the DTE. Enable – The DSU monitors the state of DTR on the DTE port and displays it on the System and Test Status screen. Disable – DTR is not monitored by the DSU. Use when a DTE does not provide the DTR lead at the interface.

Terminal Port Options

For Terminal Port options, refer to Table A-4. To access the Terminal Port Options screen, follow this menu selection sequence:

*Main Menu → Configuration (Load Configuration From) →
Configuration Edit/Display → Terminal Port*

Table A-4. Terminal Port Options (1 of 2)

Monitor DTR
Possible Settings: Enable, Disable Default Setting: Enable
Specifies monitoring of the Data Terminal Ready (DTR) control lead. Enable – Standard operation of the DTR control lead. Disable – DTR is ignored. Some external device connections may require this setting.
Inactivity Timeout
Possible Settings: Enable, Disable Default Setting: Disable
Provides automatic logoff of an ATI session through the Terminal Port. When the session is closed, User Interface Idle appears on the screen and the unit toggles the Terminal port DSR lead. Enable – The ATI session terminates automatically after the Disconnect Time set in the next option. When the session was occurring over an external modem connected to the Terminal port, the modem will interpret the DSR toggle as DTR being dropped and disconnect. Disable – An ATI session through the Terminal port will remain active indefinitely.

Table A-4. Terminal Port Options (2 of 2)

Disconnect Time(minutes)
Possible Settings: range 1 – 60 Default Setting: 5
Number of minutes of inactivity before the ATI session terminates automatically. Timeout is based on no keyboard activity. ■ Disconnect Time(minutes) option appears when Inactivity Timeout is enabled. 1 to 60 – The ATI user session is closed after the selected number of minutes.

Worksheets

B

Overview

The worksheets in this appendix summarize the configuration options accessed when you select Configuration on the Main Menu. The possible menu selections are displayed with the default settings and the possible settings.

Configuration Worksheets

System	
Configuration Option	Settings <i>Default in [Bold]</i>
Operating Mode	[DDS], LADS
DDS Line Rate (Kbps)	56, 64CC, [Autobaud]
LADS Timing	Internal, External, [Receive]
LADS Line Rate (Kbps)	56, [64]
Test Timeout	[Enable], Disable
Test Duration (min)	1–120, [10]

Network Interface	
Configuration Option	Settings <i>Default in [Bold]</i>
Network-initiated DSU Loopback (64K CC)	[Enable], Disable
Data Scrambling (64K CC)	Enable, [Disable]
V.54 Initiated DSU Loopback	Enable, [Disable]

Data Port	
Configuration Option	Settings <i>Default in [Bold]</i>
Invert Transmit Clock	Enable, [Disable]
Port (DTE) Initiated Loopbacks	[Disable], Local, Remote, Both
Bilateral Loopback	Enable, [Disable]
Carrier Control by RTS	[Constant], Switched
CTS Control	[Standard], Follow RTS, Forced On, Circuit Assurance
RLSD Control	[Standard], Forced On
DSR Control	[Standard], Forced On, On During Test
Monitor DTR	[Enable], Disable

Terminal Port	
Configuration Option	Settings <i>Default in [Bold]</i>
Monitor DTR	[Enable], Disable
Inactivity Timeout	Enable, [Disable]
Disconnect Time(minutes)	range 1 – 60 [5]

Cables and Pin Assignments

C

Overview

The following sections provide pin assignments for the:

- Terminal Port EIA-232 Connector
- V.35 User Data Port Connector
- Standard EIA-232-D Crossover Cable
- LAN Adapter Converter and Cable
- Modular RJ48S DDS Network Interface Cable

Terminal Port EIA-232 Connector

The Terminal port connects to a PC or VT100-compatible terminal.

Signal	Direction	Pin #
Transmit Data (TXD)	To DSU (In)	2
Received Data (RXD)	From DSU (Out)	3
Request to Send (RTS)	To DSU (In)	4
Clear to Send (CTS)	From DSU (Out)	5
Data Set Ready (DSR)	From DSU (Out)	6
Signal Ground (SG)	—	7
Carrier Detect (CD)	From DSU (Out)	8
Data Terminal Ready (DTR)	To DSU (In)	20

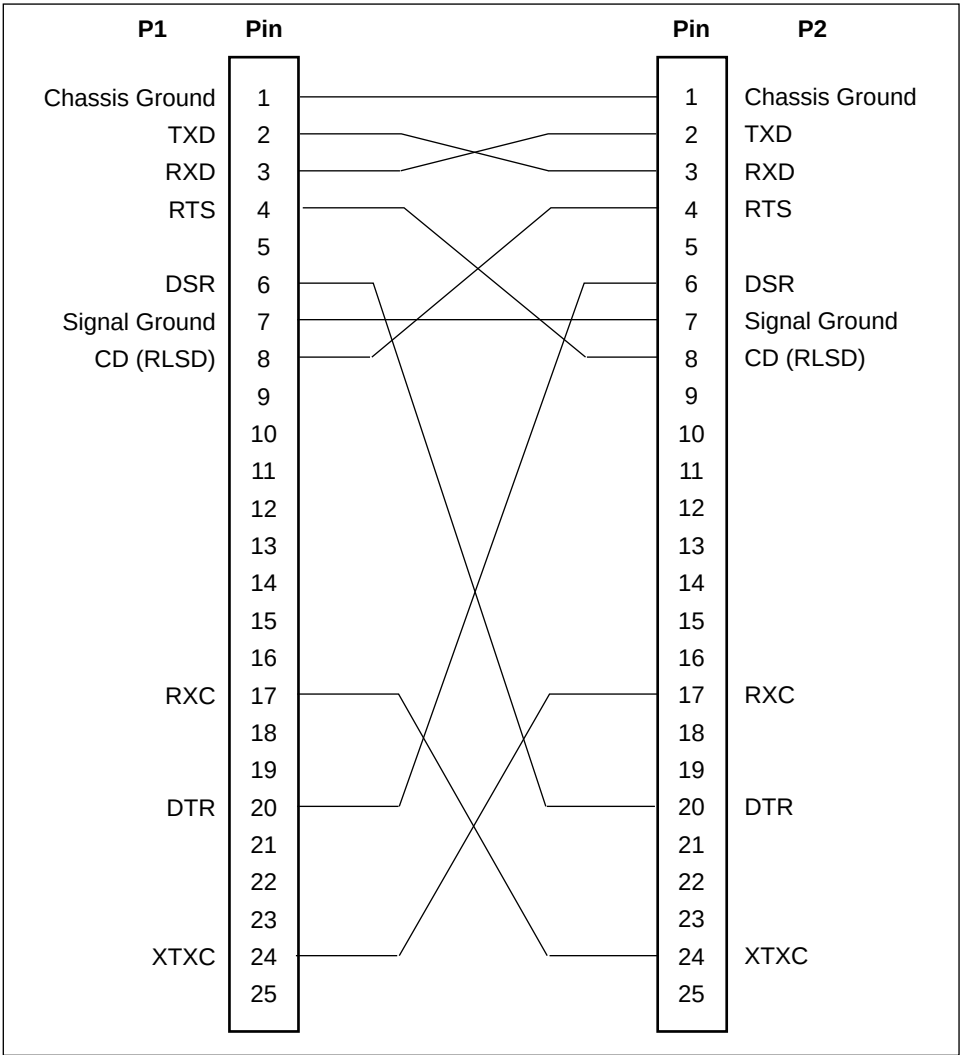
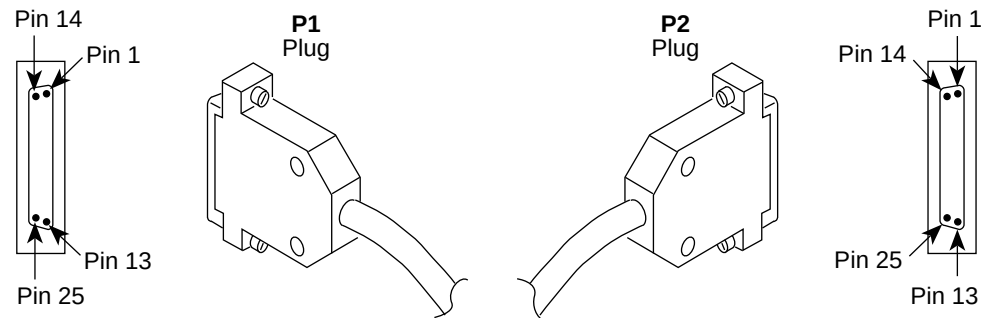
V.35 User Data Port Connector

The following table provides the pin assignments for the 34-position V.35 connector to the User Data terminal equipment.

Signal	ITU CT#	Direction	34-Pin Socket Connector
Signal Ground/Common	102	—	B
Request to Send (RTS)	105	To DSU (In)	C
Clear to Send (CTS)	106	From DSU (Out)	D
Data Set Ready (DSR)	107	From DSU (Out)	E
Received Line Signal Detector (RLSD or LSD)	109	From DSU (Out)	F
Data Terminal Ready (DTR)	108/1, /2	To DSU (In)	H
Remote Loopback (RL)	140	To DSU (In)	N
Local Loopback (LL)	141	To DSU (In)	L
Transmitted Data (TXD)	103	To DSU (In)	P (A) S (B)
Received Data (RXD)	104	From DSU (Out)	R (A) T (B)
Transmitter Signal Element Timing – DTE Source (XTXC or TT)	113	To DSU (In)	U (A) W (B)
Receiver Signal Element Timing – DCE Source (RXC)	115	From DSU (Out)	V (A) X (B)
Transmitter Signal Element Timing – DCE Source (TXC)	114	From DSU (Out)	Y (A) AA (B)
Test Mode Indicator (TM)	142	From DSU (Out)	NN

Standard EIA-232-D Crossover Cable

A standard crossover cable can be used to connect the Terminal port to an external modem.

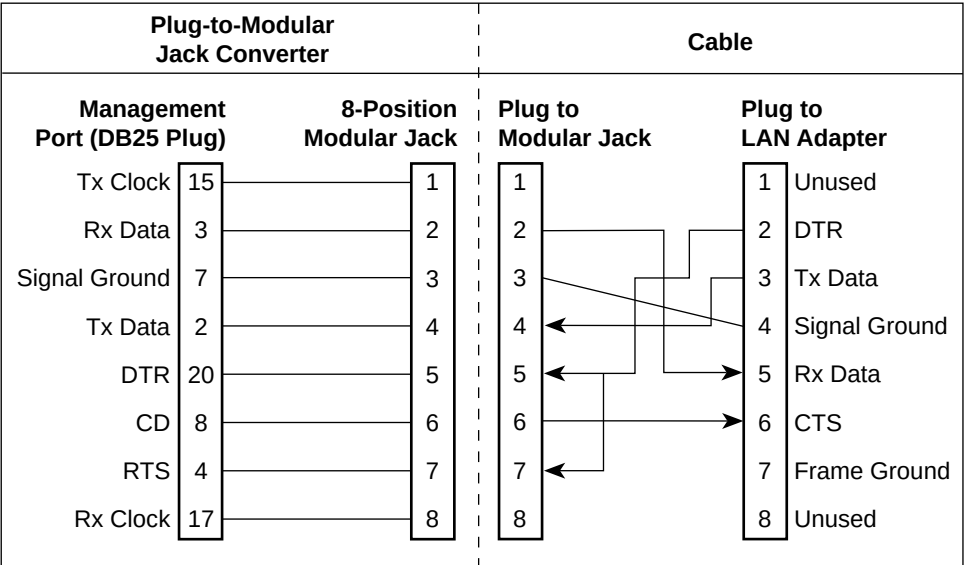


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LAN Adapter Converter and Cable

The following figure shows the:

- Pin assignments for the DB25 plug to modular jack converter between the Management port and the 8-conductor LAN Adapter cable and
- Pin assignments for the custom 8-conductor cable (with modular plugs on both ends) between the converter and the LAN Adapter.



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Modular RJ48S DDS Network Interface Cable

Network access is via a 14-foot modular cable with an RJ48S keyed plug connector on each end.

RJ48S DDS Network Interface Cable Functions	Circuit	Pin #
Transmitted data to the local loop	R	1
Transmitted data to the local loop	T	2
Received data from the local loop	T1	7
Received data from the local loop	R1	8

Technical Specifications

D

Table D-1. Model 7510 DSU Technical Specifications (1 of 2)

Item	Specifications
Housing	
Height (including feet)	2.13 inches (54.1 mm)
Height (without feet)	1.99 inches (50.6 mm)
Width	9.10 inches (231.2 mm)
Depth (case)	6.20 inches (157.5 mm)
Depth (case and connectors)	6.51 inches (165.3 mm)
Weight	1.3 pounds (0.6 kg)
Power	
Normal service voltage range	Input: 120 Vac $\pm$ 12 Vac, 60 Hz $\pm$ 3 Hz 4.9 watts (max.) at 120 Vac
Approvals	
FCC Part 15	Class A digital device
FCC Part 68	Refer to the equipment's label for Registration Number.
Safety Certifications	Refer to the equipment's label for approvals on product.
Emissions	Class A digital apparatus
Interface and Connectors	
25-pin D-subminiature connector	EIA-232/ ITU V.24 (ISO 2110) for Terminal Port
34-pin MS34 connector	ITU V.35 (ISO 2593) for DTE Port
Physical Environment	
Operating Temperature	32° to 122° F (0° to 50° C)
Storage Temperature	–4° to 158° F (–20° to 70° C)
Relative Humidity	5%—95% (noncondensing)
Shock and Vibration	Withstands normal shipping and handling
Heat Dissipation	11.6 Btu/hr. (max.) at 120 Vac

Table D-1. Model 7510 DSU Technical Specifications (2 of 2)

Item	Specifications
Network Interface Data rates LADS data rates Services supported	56 kbps and 64 kbps clear channel (CC) 56 kbps and 64 kbps 4-wire service
Network Compatibility ANSI T1.410-1992 and AT&T Technical Reference 62310-1993	56 and 64 kbps meeting desired loop loss
DTE Data Port Interface	34-pin V.35 connector

Table D-2. Model 7510 DSU LADS Connection Distances

Data Rate (kbps)	Wire Diameter (AWG)			
	19 Gauge (.0359" or .9122 mm)	22 Gauge (.0253" or .643 mm)	24 Gauge (.0201" or .511 mm)	26 Gauge (.0159" or .404 mm)
56	10.84 mi (17.45 km)	6.4 mi (10.3 km)	4.50 mi (7.24 km)	3.34 mi (5.37 km)
64	10.69 mi (17.2 km)	6.06 mi (9.76 km)	4.47 mi (7.2 km)	3.20 mi (5.15 km)

Glossary

aggregate	A single bit stream that combines two or more bit streams.
ASCII	American Standard Code for Information Interchange. A 7-bit code that establishes compatibility between data services. ASCII is the standard for data transmission over telephone lines.
ASCII Terminal or Printer	Devices that can be attached, either locally or remotely, to display or print the DSU's alarm messages.
asynchronous	A data transmission that is synchronized by a transmission start bit at the beginning of a character (five to eight bits) and one or more stop bits at the end.
AT Command Set	Attention Command Set. A group of commands, issued from an asynchronous DTE, that allows control of the modem while in Command mode. All commands must begin with the characters AT and end with a carriage return.
ATI	Asynchronous terminal interface. This feature allows a device to be controlled from an async (asynchronous) terminal like an ASCII (VT100-compatible) terminal.
autobaud mode	An operational mode in which the DSU forces automatic setting of the DDS line rate/speed (56 or 64 kbps) as soon as a valid DDS network signal is detected.
AUX port	The auxiliary communications port on a router.
BPV	Bipolar Violation. A modified bipolar signaling method in which a control code is inserted.
CCA	Circuit Card Assembly. A printed circuit board to which separate components are attached.
CCITT	Consultative Committee on International Telegraphy and Telephony. See ITU.
CD	Carrier Detect. A signal indicating that energy exists on the transmission circuit. Associated with Pin 8 on an EIA-232 interface.
channel	An independent data path.
CMI	Control Mode Idle. A control signal sent over the DDS line to indicate that no data is being sent.
COM port	Communications port. A computer's serial communications port used to transmit to and receive data from a DCE. The DCE connects directly to this port.
configuration option	Device software that sets specific operating parameters for the DSU.
CPE	Customer Premises Equipment. Terminating equipment supplied by either the customer or some other supplier that is connected to the telecommunications network (e.g., DSUs, terminals, phones, routers, modems).
CSU	Channel Service Unit. The function of the DSU that protects the T1 line from damage and regenerates the T1 signal.
CTS	Clear to Send. An EIA-lead standard for V.24 circuit CT 106; an output signal (DCE-to-DTE).
DCE	Data Communications Equipment. The equipment that provides the functions required to establish, maintain, and end a connection. It also provides the signal conversion required for communication between the DTE and the network.
DDS	Digital Data Service. Provides digital communication circuits.

DMI	Data Mode Idle. Refers to a sequence of ones transmitted or received on the DDS network.
DSR	Data Set Ready. An EIA-lead standard for V.24 circuit CT 107; an output signal (DCE-to-DTE).
DSU	Data Service Unit. Data communications equipment that provides an interface between the DTE and the digital network.
DTE	Data Terminal Equipment. The equipment, such as computers and printers, that provides or creates data.
DTR	Data Terminal Ready. An EIA-lead standard for V.24 circuit CT 108; an input signal (DTE-to-DCE).
EIA	Electronic Industries Association. This organization provides standards for the data communications industry to ensure uniformity of interface between DTEs and DCEs.
EIA-232	The EIA's standards defining the 25-pin interface between the DTE and DCE.
excessive BPV	An excessive bipolar violation condition results when at least one invalid bipolar violation has occurred every 20 milliseconds for 2 seconds.
factory defaults	A predetermined set of configuration options for general operation.
FCC	Federal Communications Commission. Board of Commissioners that regulates all U.S. interstate, intrastate, and foreign electrical communication systems that originate from the United States.
frame relay	A switching interface that is designed to get frames from one part of the network to another as quickly as possible.
full-duplex	The capability to transmit in two directions simultaneously.
HDLC	High-Level Data Link Control. A communications protocol defined by the International Standards Organization (ISO).
interface	A shared boundary between functional units.
ITU	International Telecommunication Union, formerly known as CCITT . An advisory committee established by the United Nations to recommend communications standards and policies.
LADS	Local Area Data Set is used to provide a point-to-point link between two devices (also called LDM – limited distance modem).
LAN	Local Area Network. A network designed to connect devices over short distances, like within a building.
latching loopback	A latching loopback can only be initiated or terminated by the 64 kbps clear channel network service provider.
LED	Light Emitting Diode. A status indicator that responds to the presence of a certain conditions.
link layer protocol	The protocol that regulates the communication between two network nodes.
LL	Local Loopback. An EIA-lead standard for V.24 circuit CT 141; an input signal (DTE-to-DCE).
loopback	Used to test various portions of a data link in order to isolate an equipment or data line problem. A diagnostic procedure that sends a test message back to its origination point.
LSD	Line Signal Detect. An EIA-lead standard for V.24 circuit CT 109; an output signal (DCE-to-DTE).

multiplexing	A method for interleaving several access channels onto a single circuit for transmission over the network.
node	A connection or switching point on the network.
non-latching loopback	A non-latching loopback can only be initiated or terminated by the 56 kbps network service provider.
NS	No Signal. A network-reported condition.
OOF	Out Of Frame. An error condition in which frame synchronization bits are in error. A network-reported condition.
OOS	Out of Service. A digital network trouble signal.
PAD	Packet Assembler/Disassembler.
point-to-point circuit	A data network circuit with one control and one tributary device.
protocol	The rules that govern how devices exchange information on a network. It covers timing, format, error control, and flow control during data transmission.
PSTN	Public Switched Telephone Network. A network shared among many users who can use telephones to establish connections between two points.
reset	A reinitialization of the device that occurs at power-up or in response to a reset command.
RIP	Routing Information Protocol. Specifies the routing protocol used between DSUs.
RLSD	Receive Line Signal Detect. See CD.
router	A device that makes decisions about the paths network traffic should take and forwards that traffic to its destination. A router helps achieve interoperability and connectivity between different vendor's equipment, regardless of protocols used.
RS-232	An EIA standard for the 25-pin DCE/DTE interface. Same as EIA-232.
RTS	Request to Send. An EIA-lead standard for V.24 circuit CT 105; an input signal (DTE-to-DCE).
RXC	Received Clock. An EIA-lead standard for V.24 circuit CT 115; an output signal (DCE-to-DTE).
RXD	Received Data. An EIA-lead standard for V.24 circuit CT 104; an output signal (DCE-to-DTE).
SDLC	Synchronous Data Link Control. A standard data link protocol.
synchronous	Data transmission that is synchronized by timing signals. Characters are sent at a fixed rate.
TDM	Time Division Multiplexer. A device that enables the simultaneous transmission of multiple independent data streams into a single high-speed data stream.
TM	Test Mode. An EIA-lead standard for V.24 circuit CT 142; an output signal (DCE-to-DTE).
TXC	Transmit Clock. An EIA-lead standard for V.24 circuit CT 114; an output signal (DCE-to-DTE).
TXD	Transmit Data. An EIA-lead standard for V.24 circuit CT 103; an input signal (DTE-to-DCE).
V.35	ITU-T standard for a high-speed, 34-pin, DCE/DTE interface.
WAN	Wide Area Network. A network that operates over long distances and spans a relatively large geographic area (e.g., a country).

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